REMARKS

I. Introduction

By the present Amendment, claim 8 has been amended. No claims have been added or cancelled. Accordingly, claims 8-10 and 12 remain pending in the application. Claim 8 is independent.

II. Office Action Summary

In the Office Action of May 14, 2008, claims 8, 10, and 12 were rejected under 35 USC §103(a) as being unpatentable over Japanese Patent Publication No. JP 2002-063927 to Yamamoto et al. ("Yamamoto") in view of U.S. Patent Application No. 20004/0095023 to Jacobson et al. ("Jacobson"). Claim 9 was rejected under 35 USC §103(a) as being unpatentable over Yamamoto in view of Jacobson, and further in view of U.S. Patent Application No. 2002/0131285 to Kawakami and U.S. Patent Application No. 2003/0159865 to Schmidt. These rejections are respectfully traversed.

III. Rejections under 35 USC §103

Claims 8, 10 and 12 were rejected under 35 USC §103(a) as being unpatentable over Yamamoto in view of Jacobson. Regarding this rejection, the Office Action alleges that Yamamoto discloses a system that includes a first converter connected to an electric power supply system, a circuit breaker placed between these two devices, a set of fuel cells connected to a second converter which outputs to a DC circuit, a secondary battery connected to the DC circuit through a third converter and the second converter, and a load connected in parallel with the first converter. The Office Action further indicates that Yamamoto discloses

a control unit that controls the functions of all devices in the system, as well as a current sensor detecting the current from the fuel cells. Further, Yamamoto is indicated as disclosing a secondary battery outputting power via the third converter when the receiving power exceeds the preset receiving value.

The Office Action admits that Yamamoto fails to disclose detecting the currents and voltages, and calculating the power at particular points in the circuit. Jacobson is relied upon for teaching voltage and current sensors in each segment of a system and sending those values to the control circuit. The Office Action further indicates that Jacobson discloses calculating the power using the current and voltage values obtained via the sensors.

By the present Amendment, Applicants have amended independent claim 8 in an attempt to better define the claimed invention and identify features that are not shown or suggested by the art of record. As amended, independent claim 8 defines a fuel cell system control unit that comprises:

> a first converter electrically connected to an electric power system through;
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> an electric load connected to an electric line which ties the electric power system and the first converter;
>
> a set of fuel cells connected to a DC circuit of said first converter through a second converter;
>
> a secondary battery connected to said DC circuit through a third converter;
>
> a voltage detecting means which detects an AC voltage on the power system and outputs its detected value;
>
> a receiving current detector for detecting the total of a current flowing through said first converter and a current flowing through an electric load;
>
> means for calculating a receiving electric power based on a receiving current detected by said receiving current detector and a system voltage detected by said system voltage detecting means;

means for calculating the output power of the first power converter;

means for calculating the load power which the load consumes based on the receiving power and the output power of the first power converter;

means for calculating an average value of the load power by filtering the load power calculated;

means for controlling the second power converter so that the output power of the second power converter approaches the average value of load power; and

means for controlling said third power converter so that the secondary battery outputs a power value corresponding to the power value of which said receiving power exceeds the preset receiving power value due to the increase of said load power.

The fuel cell control system of independent claim 8 includes a first converter that is electrically connected to an electric power system, an electric load connected to an electric line which ties the electric power system and the first converter, a set of fuel cells connected to a DC circuit of the first converter through a second converter, and a secondary battery connected to the DC circuit through a third converter. A voltage detecting means is provided to detect an AC voltage on the power system and output its detected value. A receiving current detector detects the total current flowing through the first converter and the current flowing through an electric load. The system also includes a means for calculating a receiving electric power based on a receiving current detected by the receiving current detector and a system voltage detected by the system voltage detection means; a means for calculating the output power of the first power converter; a means for calculating the load power which the load consumes based on the first receiving power and the output of the first power converter; and a means for calculating an average value of the load power by filtering the load power calculated. A means for controlling the second power converter is provided so that the output power of the second power

converter approaches the average value of the load power. Additionally, a means is provided for controlling the third power converter so that the secondary battery outputs a power value corresponding to the power value of which the receiving power exceeds the preset receiving power value due to the increase of the load power.

As discussed in the Specification, the fuel cell control unit includes the receiving power calculating means (15), means for calculating the output power of the first power converter (1-1c), and means (17) for calculating the power consumed by the load (3) based on the receiving power and the output power of the first power converter. See page 18, lines 1-15. The load power calculator calculates a load power (PL) that is consumed by the load and outputs the result as the load power value (PL) to the filter (22). The filter calculates a load power value (PLF) that excludes high frequency components from the load power (PL). See page 16, line 16, to page 17, line 4. The second electric converter (1-1b) is controlled so that its output power approaches the average load electric power. See page 20, lines 10-13.

According to such features, the calculated average load power that is removed from the load power is covered by the fuel cell (FC1) with the low response. The power regulator then controls the third power converter so that the receiving power (PD) doesn't exceed the threshold (PD*) of the receiving power. This allows large power changes to be provided with the secondary battery with improved response. See Figs. 6 and 11, and corresponding text.

The fuel cell system control unit defined by independent claim 8 provides various advantages over conventional systems. For example, since the peaks of the load power can be removed from the secondary battery, the receiving power can be

prevented from exceeding the acceptable value even if there are delays in operation of the fuel cell. See page 25, lines 2-6. Furthermore, since the load power can be used to create the output power command value of the fuel cell, power from the secondary battery can be separated so that the fuel cell follows the average load power. See page 25, lines 12-15. . The output of the fuel cell power generator can also be made to follow the low frequency component in the fluctuation of the load power, thereby downsizing the size of the secondary battery. See page 25, lines 16-20.

The Office Action asserts that the combination of Yamamoto and Jacobson discloses all the features recited in independent claim 8. Applicants' review of these references, however, has not revealed any disclosure or suggestion for the newly incorporated features of the claimed invention.

It is therefore respectfully submitted that independent claim 8 is allowable over the art of record.

Claims 9, 10, and 12 depend from independent claim 8, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 8.

IV. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.